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ABSTRACT

The study is based on the assumption that certain noncognitive factors influence the learning process, and attempts to tentatively isolate what such variables might be. Subjects were 93 students enrolled in a General Psychology course. Each completed the Myers-Briggs Type Indicator, and was then assigned randomly to one of 4 treatment groups: (1) that in which members performed a verbal discrimination learning task with a positive set (i.e., "Your Myers-Briggs score indicates you will do very well"); (2) that in which members performed the same task, but with a negative set ("...you will not do well"); (3) that in which members performed a paired-associate learning task with a positive set; and (4) that in which members performed the same task with a negative set. No significant differences are reported. The data clearly do not support the hypothesis that these non-cognitive factors measured in this fashion affect this type of learning. (TL)

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The Wisconsin State Universities Consortium of Research Development

Research Report

PERSONALITY CORRELATES OF SUSCEPTIBILITY TO SET IN LEARNING

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Cooperative Research

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FINAL REPORT

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SUMMARY

The study is based on the assumption that certain non-cognitive factors influence the learning process. The research is a preliminary investigation to attempt to tentatively isolate what such variables might be. The Ss were 93 students enrolled in General Psychology at Wisconsin State University - La Crosse. Each student completed the Myers-Briggs Type Indicator. Each was randomly assigned to one of four treatment groups. Group I performed a verbal discrimination learning task with a positive set. Group II performed the same task with a negative set. Group III performed a paired-associate learning task with a positive set. Group IV performed the same task with a negative set.

An analysis of variance was completed with set, sex, and set-sex interaction as the discrete variants, and the scales of the Myers-Briggs, EI, SN, TF, JP as the covariants.

There were not statistically significant differences in the learning of either task based on any of these variants or covariants. The data clearly does not support the hypothesis that these non-cognitive factors measured in this fashion affect this type of learning. The data suggests that future research concentrate on better measures of non-cognitive factors, and that intelligence variables be better controlled.

INTRODUCTION

Any method used to screen college applicants and predict their academic success is beset with failures. Often this failure may not be the result of miscalculating a student's intellectual ability, but rather is the result of not adequately measuring non-cognitive factors which may influence learning. Increasingly, the research seems to indicate that while verbal ability is the best single predictor of college success, the personal characteristics of the learner are also important (Berger, 1961; Berger, 1963, Herbrun, 1962; Astin, 1964; Gough, 1953; Shaw et al 1960; and Powell and Jourard, 1963.)

It seems reasonable to assume that if psychologists and educators knew which personal characteristics were important they could assist the student in manipulating them to his own academic advantage. This study is a preliminary attempt to identify some non-cognitive concepts that might contribute to academic learning at the college level.

METHODS

Subjects: The Ss were 93 students enrolled in General Psychology Spring Semester, 1968 at Wisconsin State University - La Crosse. Each s completed the Myers-Briggs Type Indicator. Each s was then assigned randomly to a treatment group, and asked to participate in a verbal learning experiment.

Group I performed a verbal discrimination learning task with a positive set. Group II performed the same task with a negative set. Group III performed a paired-associate learning task with a positive set. Group IV performed the same task with a negative set.

The set was established in the following manner. Each student was brought into the experiment room and the experimenter read to him as follows:

> "The Myers-Briggs Type Indicator which you took earlier this semester in Mr. _____ General Psychology class is a test designed to determine whether an individual prefers to utilize information he has gained intuitively or information he has gained empirically in the solution of cognitive skill problems. As you know, either of these methods is effective in solving cognitive problems, but some individuals prefer or are more talented in one area than in another."

At this point, the instructions varied and Group I was told:

> "Your scores on the test indicate that in solving cognitive skill tasks you perform better in an empirical fashion as opposed to an intuitive one. We will demonstrate this by giving you a verbal discrimination cognitive skill task.

Group II was told:

> "Your scores on the test indicate that in solving cognitive skill tasks, you perform better in an intuitive fashion as opposed to an empirical fashion. We will demonstrate this point by giving you a verbal discrimination cognitive skill task. Your Myers-Briggs scores indicate you will not do well on this task."

Group III was told:

> "Your scores on the test indicate that in solving cognitive skill tasks, you perform better in an intuitive fashion as opposed to an empirical fashion. We will demonstrate this point by giving you a paired-associate cognitive skill task. Your Myers-Briggs scores indicate you will do very well on this task."

Group IV was told:

> "Your scores on the test indicate that in solving cognitive skill tasks, you perform better in an empirical fashion as opposed to an intuitive one. We will demonstrate this by giving you a paired-associate cognitive skill task. Your Myers-Briggs scores indicate that you will not do well on this task."

None of the instructions were relevant, as Ss were assigned randomly to groups. At this point in the experiment, the Myers-Briggs Type Indicators had not been scored.

After receiving the instructions, the Ss were given the appropriate task. The words for each task were placed on a memory drum and shown at two second intervals. The verbal discrimination task words were shown simultaneously, and the Ss were asked to pick the "correct" word. The paired-associate task words presented the customary fashion. Words were matched for association value. Word lists can be found in Appendix A. The total errors and the number of trials to learn the list perfectly were calculated for each subject. If a Ss could not complete a perfect trial in fifteen (15) attempts, the experiment was terminated. After all Ss had completed the experiment, they were completely de-briefed.

The Myers-Briggs Tests were scored for all Ss. A continuous score was used for each of the four scales. The Appendix contains the rationale for each scale and an explanation of the scoring.

FINDINGS AND ANALYSIS

A four part analysis of covariance was completed. The discrete variants were set, sex and set-sex interaction, and the covariants were the Myers-Briggs scales, EI (extroversion - introversion), SN (sensing-intuiting), TF (thinking-feeling) and JP (judgment - perception). The results are presented in Tables 1,2,3, and 4. Table 1 presents the results of the verbal discrimination task with the number of errors as the dependent variable. Table 2 presents the results

of the verbal discrimination task with the trials to criterion as the dependent variable. Table 3 presents the results of the paired-associate task with the number of errors as the dependent variable. Table 4 presents the results of the paired-associate task with the trials to cirterion as the dependent variable.

The results do not support the hypothesis that these non-cognitive factors (sex, set, sex-set interaction, EI, SN, TF, and JP) as measured in this experiment affect acquisition in simple verbal learning tasks. It is possible that the variables are 1) not adequately measured; 2) are washed out by the intelligence factor adequately measured; 3) not appropriate to learning. Before one concludes that these variables are not appropriate to learning, one needs to redesign the experiment to control for intelligence. If intelligence were controlled, these treatment variables might have some effect on the results. Measurement of non-cognitive factors is difficult and more data needs to be collected on the Myers-Briggs to determine if each of its scales measures a distinct variable which might relate to learning. The effectiveness of establishing set needs further investigation in this context. Procedural checks should probably be completed to determine if the Ss believed the set that was established for him.

CONCLUSIONS AND RECOMMENDATIONS

The weaknesses of the study need to be corrected before another attempt is made. The study did not give much information about non-cognitive factors that influence learning. This general problem, however, is still important and seems to merit more preliminary work in isolating variables, and then detailed work in attempting to manipulate these variables in the learning process.

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APPENDIX A

Word Lists

I. Verbal Discrimination Word List

machinery	allow
day	serious
increase	get
name	both
ground	older
long	choose
above	enough
doorway	follow

II. Paired-Associate Word List

box	way
complete	ask
always	course
experiment	stay
watch	permanent
something	rise
prove	come
try	very

TABLE 1

ANALYSIS OF COVARIANCE VERBAL DISCRIMINATION TASK

NUMBER OF ERRORS

	SS	df	MS	F	p	Gp	N	$\bar{X}$	Sd
Discrim Errors						00	11	13.000	5.310
Set	79.26179	1	79.26179	1.7022		01	15	12.600	7.670
Sex	24.13011	1	24.13011	.5176		10	9	8.667	3.640
Set*Sex	45.08751	1	45.08751	.9672		11	9	13.333	9.083
EI	15.24190	1	15.24190	.3269		-0	20	11.050	5.031
SN	101.0667	1	101.0667	2.1679		-1	24	12.875	8.040
TF	2.912689	1	2.912689	.0624		0-	26	12.769	6.653
JP	62.14989	1	62.14989	1.3331		1-	18	11.000	7.129
Error	1678.268	36	46.618555			Tot	44	12.045	6.827

rEI=.17578 rSN=.16735 rTF=-.13267 rJP=-.13249

00=-F 01=-M 10=+F 11=+M -0=M 0-=- 1-=+ Tot=Total

TABLE 2

ANALYSIS OF COVARIANCE VERBAL DISCRIMINATION TASK

TRIALS TO CRITERION

	SS	df	MS	F	p	Gp	N	$\bar{X}$	Sd
Discrim-Trials						00	11	6.091	1.973
Set	4.013353	1	4.013353	.6162		01	15	2.000	2.690
Sex	2.495006	1	2.495006	.3931		10	9	5.000	1.936
Set*Sex	3.233391	1	3.233391	.4964		11	9	6.556	3.395
EI	5.408939	1	5.408939	.8304		-0	20	5.600	1.984
SN	8.587500	1	8.587500	1.3184		-1	24	6.208	2.919
TF	.542078	1	.542078	.0832		0-	26	6.038	2.375
JP	11.93219	1	11.93219	1.8319		1-	18	5.778	2.798
Error	234.4838	36	6.513438			Tot	44	5.932	2.528

rEi=.21483 rSN=.13649 rTF=-.14294 rJP=-.18770

00=-F 01=-M 10=+F 11=+M -0=M 0-=- 1-=+ Tot=Total

TABLE 3

ANALYSIS OF COVARIANCE PAIRED ASSOCIATE TASK

NUMBER OF ERRORS

	SS	df	MS	F	p	Cp	N	$\bar{X}$	SD
Paired Errors						00	14	25.071	13.071
Set	227.39249	1	227.39249	.6053		01	7	33.429	12.448
Sex	645.18519	1	645.18519	1.7175		10	11	28.727	20.771
Set*Sex	51.17041	1	51.17041	.1362		11	12	43.750	37.136
EI	967.8309	1	967.8309	2.5764		-0	25	26.680	16.605
SN	63.09583	1	63.09583	.1680		-1	19	39.947	22.975
TF	816.6125	1	816.6125	2.1739		0-	21	27.857	13.184
JP	7.238281	1	7.238281	.0193		1-	23	36.565	24.963
Error	13523.45	36	375.651438			Tot	44	32.409	20.470

rEI=.31937 rSN=-.01916 rTF=-.32171 rJP=.09557

00=-F 01=-M 10=+F 11=+M -0=F -1=M 0-=- 1-=+ Tot=Total

TABLE 4

ANALYSIS OF COVARIANCE PAIRED ASSOCIATE TASK

TRIALS TO CRITERION

	SS	df	MS	F	p	Gp	N	$\bar{X}$	Sd
Paired Trials						00	14	8.286	3.148
Set	.199951	1	.199951	.0143		01	7	9.571	3.155
Sex	21.182694	1	21.182694	1.5118		10	11	28.727	4.149
Set*Sex	.262306	1	.262306	.0187		11	12	10.667	4.250
EI	45.13241	1	45.13241	3.2210		-0	25	8.280	3.542
SN	.461376	1	.461376	.0329		-1	19	10.263	3.827
TF	6.794880	1	6.794880	.4849		0-	21	8.714	3.133
JP	1.023907	1	1.023907	.0731		1-	23	9.522	4.284
Error	504.4307	36	14.011963			Tot	44	9.136	3.758

rEI=.32144 rSN=-.03437 rTF=-.18988 rJP=.03537

00=-F 01=-M 10=+F 11=+M -0=F -1=M 0-=- 1-=+ Tot=Total

APPENDIX B

The Myers-Briggs Type Indicator

I. Principle and Purpose of the Indicator, in Brief

Purpose

The purpose of the Indicator is to implement Jung's theory of type (1923). The gist of the theory is that much apparently random variation in human behavior is actually quite orderly and consistent, being due to certain basic differences in the way people prefer to use perception and judgment.

"Perception" is here understood to include the processes of becoming aware, - of things or people or occurrences or ideas. "Judgment" is understood to include the processes of coming-to-conclusions about what has been perceived. If people differ systematically in what they perceive and the conclusions they come to, they may as a result show corresponding differences in their reactions, in their interests, values, needs and motivations, in what they do best and in what they like best to do.

Adopting this working hypothesis, the Indicator aims to ascertain, from self-report of easily reported reactions, people's basic preferences in regard to perception and judgment, so that the effects of the preferences and their combinations may be established by research and put to practical use.

The Four Preferences

The Indicator contains separate indices for determining each of the four basic preferences which, under this theory, structure the individual's personality.

Index	Preferences as between	Affects individual's choice as to
EI	Extraversion or Introversion	Whether to direct perception and judgment upon environment or world of ideas
SN	Sensing or Intuition	Which of these two kinds of perception to rely on
TF	Thinking or Feeling	Which of these two kinds of judgment to rely on
JP	Judgment or Perception	Whether to use judging or perceptive attitude for dealing with environment

The EI index is designed to reflect whether the person is an extravert or an introvert in the sense intended by Jung, who coined the terms. The extravert is oriented primarily to the outer world, and thus tends to focus his perception and judgment upon people and things. The introvert is oriented primarily to the inner world postulated in Jungian theory, and thus tends to focus his perception and judgment upon concepts and ideas.

The SN index is designed to reflect the person's preference as between two opposite ways of perceiving, i.e., whether he relies primarily on the familiar process of sensing, by which he is made aware of things directly through one or another of his five senses, or primarily on the less obvious process of intuition, which is understood as indirect perception by way of the unconscious, with the emphasis on ideas or associations which the unconscious tacks on to the outside things perceived.

The TF index is designed to reflect the person's preference as between two opposite ways of judging, i.e., whether he relies primarily upon thinking, which discriminates impersonally between true and false, or primarily upon feeling, which discriminates between valued and not-valued.

The JP index is designed to reflect whether the person relies primarily upon a judging process (T or F) or upon a perceptive process (S or N) in his dealings with the outer world, that is, in the extraverted part of his life.

II. Scoring

The Preference Scores.

Scoring a Type Indicator produces four preference scores, one for each of the four indices: EI, SN, TF, and JP. Each index reflects one of the four preferences which, according to theory, determine type. The score for each index consists of a letter showing the direction of the preference the testee reported, followed by a number showing its reported strength.

For each of the four indices, two keys are required. For example, the score for EI is obtained by determining the points for E and the points for I separately. Of the two values thus obtained, the greater number indicates the direction of the preference and the letter part of the score. To complete the scoring, the smaller number is subtracted from the greater, and the preference score corresponding to that difference may be obtained from the appropriate column of the table following.

RAW SCORES TO PREFERENCE SCORES

Transformation of Difference Between Point Totals into Preference Scores

Male: I,N,T, or P
Female: I,N,F, or P
Any zero difference

Male: E,S,F, or J
Female: E,S,T, or J

Diff. in Points	Pref. Score	Diff. in Points	Pref. Score	Diff. in Points	Pref. Score	Diff. in Points	Pref. Score
0 =	1	17 =	35	1 =	1	18 =	35
1	3	18	37	2	3	19	37
2	5	19	39	3	5	20	39
3	7	20	41	4	7	21	41
4	9	21	43	5	9	22	43
5	11	22	45	6	11	23	45
6	13	23	47	7	13	24	47
7	15	24	49	8	15	25	49
8	17	25	51	9	17	26	51
9	19	26	53	10	19	27	53
10	21	27	55	11	21	28	55
11	23	28	57	12	23	29	57
12	25	29	59	13	25	30	59
13	27	30	61	14	27	31	61
14	29			15	29	32	63
15	31			16	31	33	65
16	33			17	33	34	67

Note: In the case of a zero difference, the preference score is

I1, N1, T1, or P1 for males
I1, N1, F1, or P1 for females

Continuous Scores

When continuous scores are wanted for statistical purposes, they should, to avoid confusion, be uniformly obtained. For an I, N, F or P score, the continuous score is the preference score plus 100. For an E,S,T or J score, the continuous score is 100 minus the preference score. While the arithmetic involved is of the simplest, it may frequently be found convenient for clerical help to use the table following this to speed conversion.

For 20 years all research by the authors has followed this convention as to the positive poles of the indices, and it is suggested that the same system be adopted by other users. Adherence to a uniform method will insure that the signs of correlations, factor loadings, etc., in different studies will correspond. In making interpretations of reported findings, one should determine the type of scoring used in order to avoid errors in interpretation.

When regressions of dependent variables are plotted on the indices, these continuous scores, increasing normally from left to right, will put E scores at the left and I scores at the right, S scores at the left and N scores at the right, etc., and thus correspond to the designation of the index, which should always read from left to right along the horizontal axis for such regressions.

These are scores we have punched in K 46-58

Transformation of Preference Scores into Continuous Scores

	Preference Score		Continuous Score		Preference Score		Continuous Score
I,N,F,P	01	=	101	E,S,T,J	01	=	99
	03		103		03		97
	05	=	105		05		95
	07		107		07		93
I,N,F,P	09	=	109	E,S,T,J	09		91
	11		111		11		89
	13	=	113		13		87
	15		115		15		85
I,N,F,P	17	=	117	E,S,T,J	17		83
	19		119		19		81
	21	=	121		21		79
	23		123		23		77
I,N,F,P	25	=	125	E,S,T,J	25		75
	27		127		27		73
	29	=	129		29		71
	31		131		31		69
I,N,F,P	33	=	133	E,S,T,J	33		67
	35		135		35		65
	37	=	137		37		63
	39		139		39		61

more

Transformation of Preference Scores into Continuous Scores - cont.

	Preference Score		Continuous Score
I,N,F,J	41	=	141
	43		143
	45		145
	47		147
I,N,F,P	49	=	149
	51		151
	53		153
	55		155
I,N,T,P	57	=	157
	59		159
	61		161

	Preference Score		Continuous Score
E,S,T,J	41	=	59
	43		57
	45		55
	47		53
E,S,T,J	49	=	51
	51		49
	53		47
	55		45
E,S,T,J	57	=	43
	59		41
	61		39
	63		37
E,S,T,J	65	=	35
	67		33

END

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